

Candidate Name	Centre Number	Candidate Number
		2



GCE AS/A level

1072/01

BIOLOGY/HUMAN BIOLOGY – BY2

P.M. TUESDAY, 19 January 2010

1½ hours

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1	5	
2	6	
3	12	
4	9	
5	11	
6	17	
7	10	
Total	70	

INSTRUCTIONS TO CANDIDATES

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided in this booklet.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets at the end of each question or part-question.

You are reminded of the necessity for good English and orderly presentation in your answers.

The quality of written communication will affect the awarding of marks.

1. The table below lists five organisms, together with the five kingdoms. Tick (✓) a box to place each organism in the kingdom to which it belongs. [5]

	<i>Plantae</i>	<i>Animalia</i>	<i>Protoctista</i>	<i>Fungi</i>	<i>Prokaryotae</i>
Jellyfish					
Yeast					
Amoeba					
Moss					
Bacterium					

(Total 5 marks)

2. (a) Which one of the following features, found in two different animals, indicates a common ancestor? [1]
(Tick (✓) your choice.)

Fins of sharks and dolphins. ☐

Wings of birds and bats. ☐

- (b) (i) The Galapagos finches illustrate the evolution of different birds from one ancestral form. What name is given to this evolutionary spread of new forms? [1]

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- (ii) If a foreign finch was introduced into Britain now, it would be extremely unlikely for it to give rise to a similar variety of descendants to those on the Galapagos. What was different about the situation when the first finches arrived on those islands? [2]

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- (c) Why are the Galapagos finches now recognised as separate species, rather than simply varieties of the same species? [1]

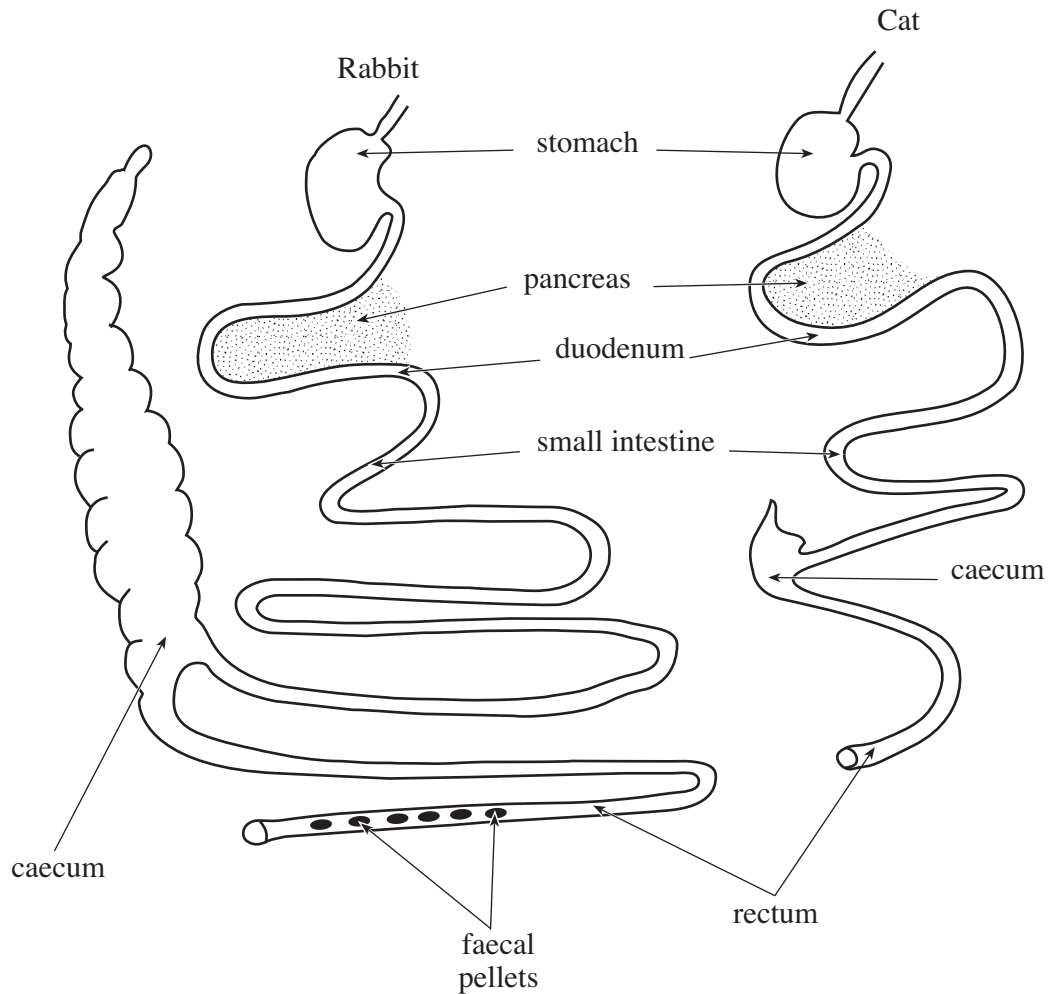
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- (d) State the best technique for working out the relationships between the descendants of the original finch. [1]
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(Total 6 marks)

3. The two diagrams below show a comparison of the gut structure in a rabbit and a cat.



- (a) (i) State **two** structural differences between the cat and the rabbit gut that you can see in the diagram. [2]

1.
2.

- (ii) In a similar diagram of a human gut these features would be intermediate between those shown. Give a reason for this. [1]

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- (b) State **three** differences that can be seen when comparing the dentition of the cat and the rabbit. [3]

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- (c) The caecum is packed with bacteria. Explain why this is necessary and its importance to the rabbit. [2]

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- (d) The diagram shows that the faeces of rabbits form distinct pellets in the rectum. These are eaten in a process called refection.

- (i) Suggest a reason for refection. [1]

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- (ii) Cows feed in a similar way to rabbits but do not show refection. Explain this difference. [3]

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(Total 12 marks)

4. (a) Name **three** structural features of fish gills which make them efficient gaseous exchange organs. [3]

1.

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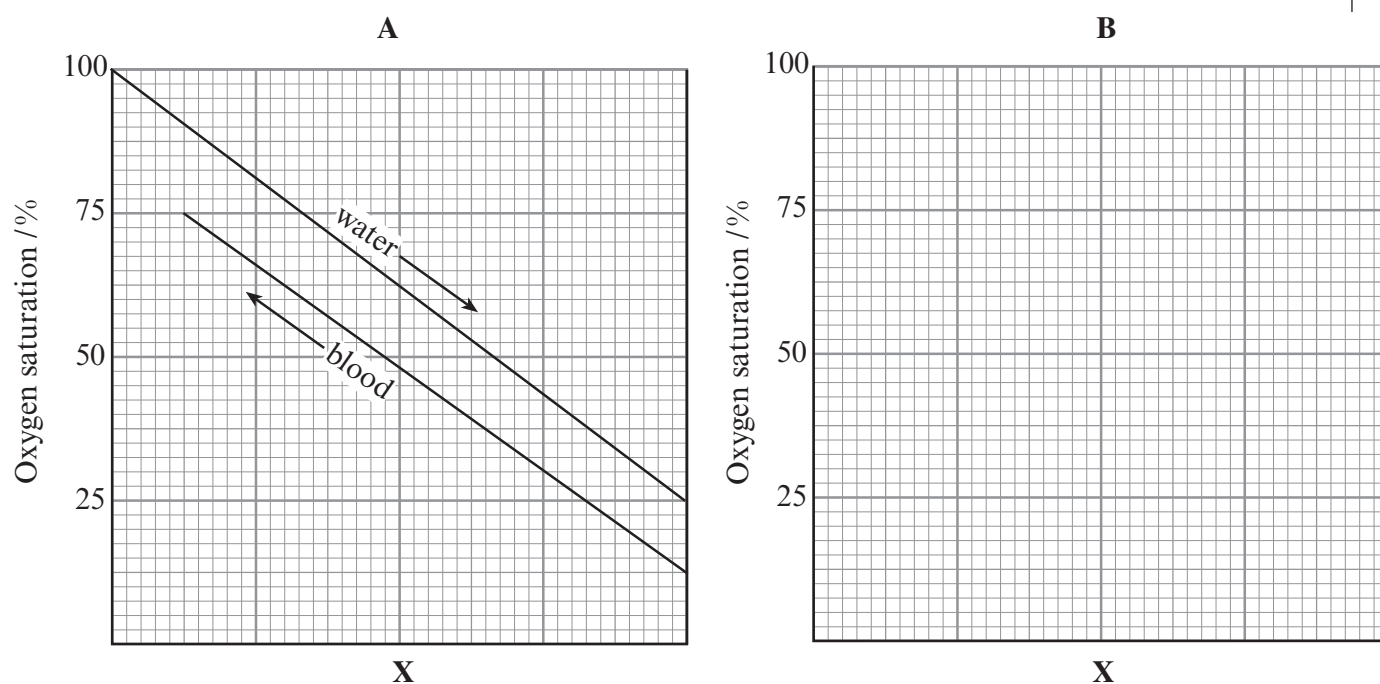
2.

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3.

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- (b) Diagram A below illustrates counter current flow in a cod.



In shark gills there is a parallel flow system supplying oxygen.
On diagram B draw a graph to show oxygen uptake in the shark.
(Assume that the flow rates are the same in both cases.)

[3]

- (c) What is represented by the label **X** on the horizontal axis in the diagrams?

[1]

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- (d) Explain the advantages to the fish with flow A compared to a fish with flow B.

[2]

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5. Most of the carbon dioxide (85%) transported in the human blood stream is carried as bicarbonate ions.

(a) Describe the **two other** ways in which the remaining 15% is carried. [2]

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(b) Carbon dioxide enters a red blood cell (erythrocyte) and is converted into carbonic acid by an enzyme.

(i) Name this enzyme. [1]

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(ii) Since carbon dioxide dissolves in water to form carbonic acid anyway, explain why the enzyme is necessary. [1]

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(c) The carbonic acid in the red blood cell is ionised into hydrogen ions and bicarbonate ions.

(i) Describe what then happens to the bicarbonate ions. [1]

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(ii) Describe the function of the hydrogen ions produced in the red blood cell and explain its importance in muscle tissue. [2]

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(iii) Name **one other** ion involved in carbon dioxide transport and describe its function. [2]

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(d) The solubility of carbon dioxide in water is a concern for ecologists as a consequence of increasing carbon dioxide levels in the atmosphere. Suggest a reason for this concern with an example of a problem that might arise. [2]

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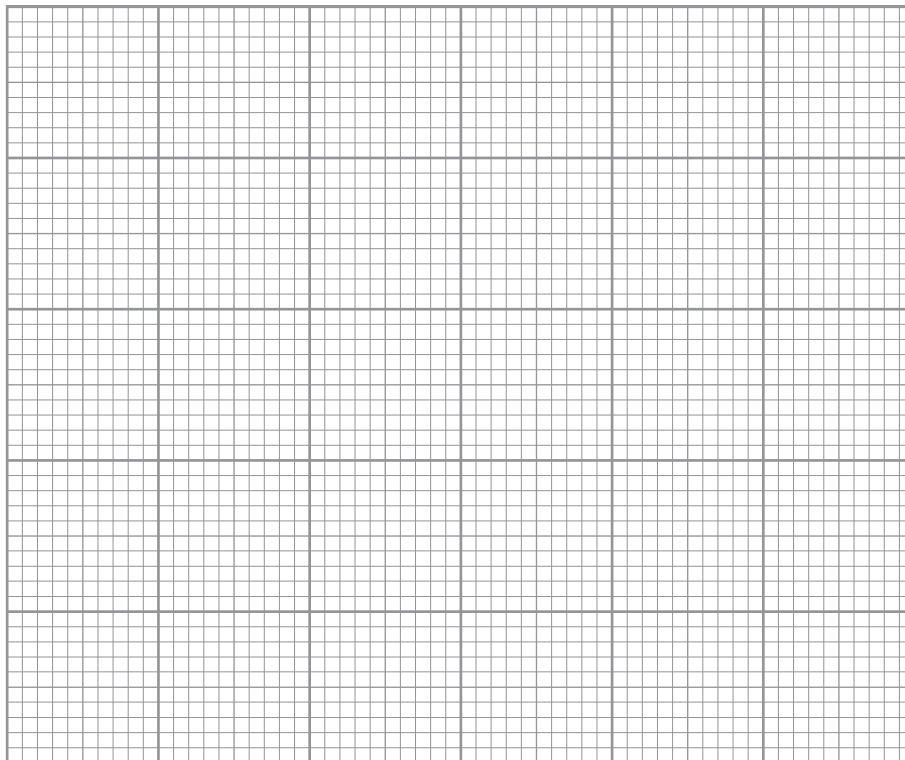
(Total 11 marks)

6. The table shows the transpiration rate of a plant, measured at regular intervals over a 20hr period.

Time (hrs)	04.00	08.00	12.00	16.00	20.00	24.00
Rate (gh^{-1})	0.25	1.50	4.00	7.50	3.25	0.75

- (a) Plot these data on the graph paper provided.

[4]



- (b) Describe and explain the difference in the transpiration rate at 0800hrs compared with 1600hrs.

[4]

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(c) Under experimental conditions, give **two** ways in which the peak value could be increased. [2]

1.

2.

(d) The cohesion-tension theory explains the movement of water up the xylem of a plant.

(i) Explain what is meant by *cohesion*. [1]

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(ii) Explain how *tension* is generated. [2]

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(iii) What additional force helps to support the water molecules in the xylem against the force of gravity? [1]

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(e) The values plotted on the graph never fall to zero. This suggests that throughout the 24 hour period a constant additional small force is influencing the upward movement of water.

(i) Name this force. [1]

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(ii) Explain how this force is generated. [2]

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(Total 17 marks)

Any diagrams included in your answer must be fully annotated.

Or (b) Using fish and mammals as examples, explain how the reproductive strategies of animals have changed as a result of the evolution of life on land. Comment on the advantages of the mammalian strategies. [10]

[illegible]

